

Magnetars: Pi in the sky?

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Abstract: Magnetars are incredible astrophysical objects with the largest ever observed magnetic fields that are more than a thousand times larger than Pulsar magnetic fields. They are also associated with some of the most powerful flares ever seen. The origin of such strong magnetic fields is a fascinating problem in physics. I shall describe in this talk work done with V. Soni, with earlier participation by Dipankar Bhattacharya, wherein we have proposed neutral pion condensation in high baryon density phase transitions as the source for such strong magnetic fields. I will also review related work by Nielsen and Soni. This model naturally explains many highly puzzling features of magnetars. A full understanding of magnetars will require ideas and concepts from particle physics, condensed matter physics and plasma physics.

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